REMARKS/ARGUMENTS

Favorable reconsideration of this application is respectfully requested.

Claims 1-18 and 21-26 are pending in this application. Claims 15-18 have been withdrawn from consideration. Claims 19 and 20 have been canceled without prejudice or disclaimer. Claims 1- 8 and 10 have been amended and new Claims 21-26 have been added to better set foth the invention, all without the introduction of any new matter.

In this last respect, Claims 21-24 are supported in Figs. 16-17 and related part thereof while new Claim 25 is supported in the specification (page 1, lines 29-30) and new Claim 26 is supported in eighth embodiment of the specification.

The outstanding Action presents a rejection of Claims 1-7 and 10 as being unpatentable over Sakakima et al. (U.S. Patent No. 6,567,246, Sakakima) under 35 U.S.C. §103(a), a rejection of Claims 11, 13, 14, 19, and 20 as being anticipated by Gill (U.S. Patent No. 6,275,363)under 35 U.S.C. §102(e), and a rejection of Claim 12 as being unpatentable over Gill in view of Sin et al. (U.S. Patent No. 6,353,318, Sin).

Initially, Applicants gratefully acknowledge the indication that Claims 8 and 9 are only objected to as being dependent on a rejected base claim but would be allowed if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

One of the features recited in the present invention defined by Claim 1 is that the layer containing an oxide as a principal component contains a magnetic transition layer metal element which does not bond to oxygen and which is at least one of Co, Fe, and Ni.

The inventors discovered that in the case of using an oxide having a stoichimetric composition, it is not possible to strike a balance between a high MR ratio and a sufficiently strong magnetic coupling of the ferromagnetie layers via the oxide. On the other hand, it was

also discovered that a non-stoichimetric oxide could provide the needed balance. This non-stoichiometric oxide was achieved using the oxidation method of the present invention, which is referred to as Ion Assisted Oxidation (IAO). See Figs. 13-15, for example.

Therefore, in the present invention defined by independent Claim 1, for example, the layer containing an oxide as a principal component is further recited as containing a magnetic transition metal element which does not bond to oxygen. Therefore, no oxide having a stoichimetric composition ca be present under the terms of Claim 1.

Accordingly, in the present invention, it is possible to strike a balance between a high MR ratio and a sufficiently strong magnetic coupling of ferromagnetic layers via the layer containing an oxide because it is not a stoichimetric oxide.

On the other hand, Sakakima only teaches using oxides having a stoichimetric composition, for example, Fe_2O_3, Fe_3O_4, etc. Thus, Sakakima does not teach or suggest the base Claim 1 layer containing an oxide as a principal component that contains a magnetic transition metal element which does not bond to oxygen and which is at least one of Co, Fe and Ni. Furthermore, with the stoichimetric oxides of Sakakima, it is impossible to obtain a high MR ratio and sufficiently strong magnetic coupling of the ferromagnetic layers via the layer containing the stoichimetric oxide.

Therefore, Claim 1 distinguishes over Sakakima and Claim 1 and the claims dependent thereon (2-7 and 10) should no longer be rejected based upon the teachings thereof.

Turning to the rejection of Claims 11, 13, 14, 19, and 20 as being anticipated by Gill, it is first noted that the cancellation of Claims 19 and 20 renders this rejection thereof as being moot.

With respect to Claim 11, it is noted that this claim requires that the non-magnetic crystalline layer must be substantially crystalline. The crystalline make up of this layer is

important as to preventing diffusion of atoms and phase transformation at a high temperature state. Therefore, the base Claim 11 non-magnetic crystalline layer is very thermally stable. As a result, high electron reflective characteristics can be maintained. See the specification at page 48, lines 27-32, for example.

The outstanding Action asserts that a second barrier layer 220 of Fig. 12 of Gill, which is made of $A1_2O_3$, corresponds to the non-magnetic crystalline layer of base Claim 11. However, this layer of Gill is made of $A1_2O_3$ and is amorphous, not crystalline.

Consequently, in Gill, diffusion and phase transformation easily occur in a high temperature state. As a result, the rapid change of the electron potential is lost and the electron reflective characteristics deteriorate. See the specification at page 48, lines 20-26, for example.

Therefore, the second barrier layer 220 of Gill cannot be reasonably equated to the non-magnetic crystalline layer required by Claim 11.

Thus, Gill does not teach or suggest a layer provided on one side of the high conductive layer 304 remoter from the magnetizaiotn free layer 212 that is substantially crystalline and this rejection of Claim 11 and Claims 13 and 14 that depend on Claim 11 is traversed.

With respect to the rejection of Claim 12 over Gill in view of Sin, it is clear that Sin cures none of the above-noted Gill deficiencies. Accordingly, the rejection of Claim 12 is also traversed for the reasons noted above as to base Claim 11.

CONCLUSION

Consequently, in view of the foregoing amendment and remarks, it is respectfully submitted that no further issues remain outstanding in the present application, and that this application is clearly in condition for formal allowance and an early and favorable action to that effect is, therefore, respectfully requested.

Respectfully submitted,

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